U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

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Mr. A. W. Conklin, Head
Air Emissions and Defense
Waste Section
State of Washington
Department of Health
P.O. Box 47827
Olympia, Washington 98504

Addressees:

APPROVAL OF RADIOACTIVE AIR EMISSIONS NOTICES OF CONSTRUCTION (NOC) FOR OPERATION OF NEW VENTILATION SYSTEMS IN AN AND AW TANK FARMS

Attached for your review and approval is the radioactive air emissions NOC application for operation of new ventilation systems in AN and AW Tank Farms (Attachment 1) and the Hanford Site Air Operating Permit 00-05-006, "Notification of Off-Permit Change" (Attachment 2). This NOC is being submitted to you in accordance with Washington Administrative Code 246-247, "Radiation Protection Air Emissions," and Title 40 Code of Federal Regulations, Part 61, "National Emissions Standards for Hazardous Air Pollutants."

This NOC combines two previously submitted NOCs, currently being reviewed by the State of Washington Department of Health (WDOH), for operation of new ventilation systems in AN and AW Tank Farms. This combined NOC approach was requested by a representative of the WDOH during approval negotiations in a meeting held on December 17, 2003. Upon approval of this NOC, operation of the new AN and AW Tank Farm Ventilation System exhauster will be permitted. This activity is being conducted under Project W-314.

If you have any questions, please contact me, or your staff may contact Dennis W. Bowser, Environmental Division, (509) 373-2566.

Sincerely,

Roy J. Schepens
Manager

ED:DWB

Attachments: (2)

cc w/attachs:
D. J. Carrell, CH2M HILL
C. J. Kemp, CH2M HILL
J. Cox, CTUIR
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J. Martell, WDOH Richland Office of River Protection (2 copies)
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Administrative Record
CH2M Correspondence Control
Environmental Portal, LMSI

cc w/o attachs:
B. G. Erlandson, BNI
E. S. Aromi, CH2M HILL
J. A. Bates, FHI
M. F. Jarvis, RL

Attachment 1
04-ED-028

Radioactive Air Emissions Notice of Construction Application for Operation of New Ventilation Systems in AN and AW Tank Farms

Radioactive Air Emissions Notice of Construction, Project W-314 – Operation of New Ventilation Systems in AN and AW Tank Farms

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LIST OF LIST OF ABBREVIATIONS, ACRONYMS, AND INITIALISMS

ALARACT	As Low As Reasonably Achievable Control Technology
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
APQ	Annual Possession Quantity
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
BARCT	Best Available Radionuclide Control Technology
CFR	Code of Federal Regulations
DST	Double Shell Tank
EPA	U.S. Environmental Protection Agency
ERDA	U.S. Energy Research and Development Agency
FEMP	Facility Effluent Monitoring Plan
HEPA	High Efficiency Particulate Air
HPS	Health Physics Society
MEI	Maximum Exposed Individual
MPR	Maximum Public Receptor
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	Notice of Construction
NDA	Nondestructive Analysis
ORP	U.S. Department of Energy, Office of River Protection
PNNL	Pacific Northwest National Laboratory
PTE	Potential to Emit
RCW	Revised Code of Washington
RL	U.S. Department of Energy, Richland Operations Office
SEPA	State Environmental Policy Act
SST	Single Shell Tank
TEDE	Total Effective Dose Equivalent
TWINS	Tank Waste Information Network System
USC	United States Code
WAC	Washington Administrative Code
WDOH	Washington State Department of Health
WTP	Waste Treatment and Immobilization Plant

INTRODUCTION

This notice of construction (NOC) will be submitted for approval in accordance with *Washington Administrative Code* (WAC) 246-247-060, *Applications, Registration and Licensing*, to operate new ventilation systems in AN and AW Tank Farms. Additionally, pursuant to 40 CFR 61.09 (a)(1), *National Emission Standards for Hazardous Air Pollutant*, this application is intended to provide anticipated initial start-up notification. It is requested that the U.S. Environmental Protection Agency (EPA) approval of this application also will constitute EPA acceptance of the initial start-up notification. Approval for installation of these new ventilation systems were as follows:

AN Farm, external letter AIR 03-602, A. W. Conklin, Washington State Department of Health (WDOH), to J. Hebdon, U. S. Department of Energy, Richland Operations (RL), and J. E. Rasmussen, U.S. Department of Energy, Office of River Protection (ORP), dated June 3, 2003. This letter transmitted Approval Number AIR 03-302 for NOC ID 565.

AW Farm, external letter AIR 03-712, A. W. Conklin, WDOH, to J. Hebdon, RL, and J. E. Rasmussen, ORP, dated August 01, 2003. This letter transmitted Approval Number AIR 03-712 for NOC ID 566.

These new ventilation systems include the replacement of the existing AN and AW exhaust trains with two parallel exhaust trains (in each farm). Each individual train is capable of providing up to at least 0.9 m^3/s (2,000 standard ft^3/min) of exhaust flow. In addition, these systems are designed for both trains to operate either one at a time or together for a combined total flow rate of up to 1.89 m^3/s (4,000 standard ft^3/min) for each farm. Operation of these new ventilation systems will be for the storage, treatment, retrieval, and disposal of the waste contained within the tanks. This includes transfer of waste to the Waste Treatment and Immobilization Plant (WTP).

The total effective dose equivalent (TEDE) to the maximum exposed individual (MEI) for purposes of this NOC is estimated to be 1,330 mrem/yr without controls and 2.6 mrem/yr with controls. These emission estimates are summarized in Table 1.

Table 1. Emissions Summary.

	Estimated Emissions	
	Unabated	Abated
	mrem per year	
AN Farm Ventilation System removal	1.7E-02	1.7E-02
AW Farm Ventilation System removal	2.8E-02	2.8E-02
AN Farm New Ventilation System operation	690	1.4
AW Farm New Ventilation System operation	640	1.2
Sum	1,330	2.6

Emissions from AN and AW Farm Ventilation Systems were last reported under the existing stack number 296-A-29 and 296-A-27 respectively in DOE/RL-2003-19, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002.* The emission results are listed in Table 2.

Table 2. Emissions Report Summary.

		Curies	mrem/yr
For AN Farm:	Alpha	1.3E-09	1.9E-09
	Beta	1.9E-07	4.4E-09
For AW Farm:	Alpha	1.2E-09	1.7E-09
	Beta	4.7E-08	1.1E-09

This report also cites the total dose due to radionuclide emissions in calendar year 2002 from all Hanford Site point sources, diffuse sources, and fugitive sources as 0.066 mrem.

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Figure 1. The Hanford Site Map.

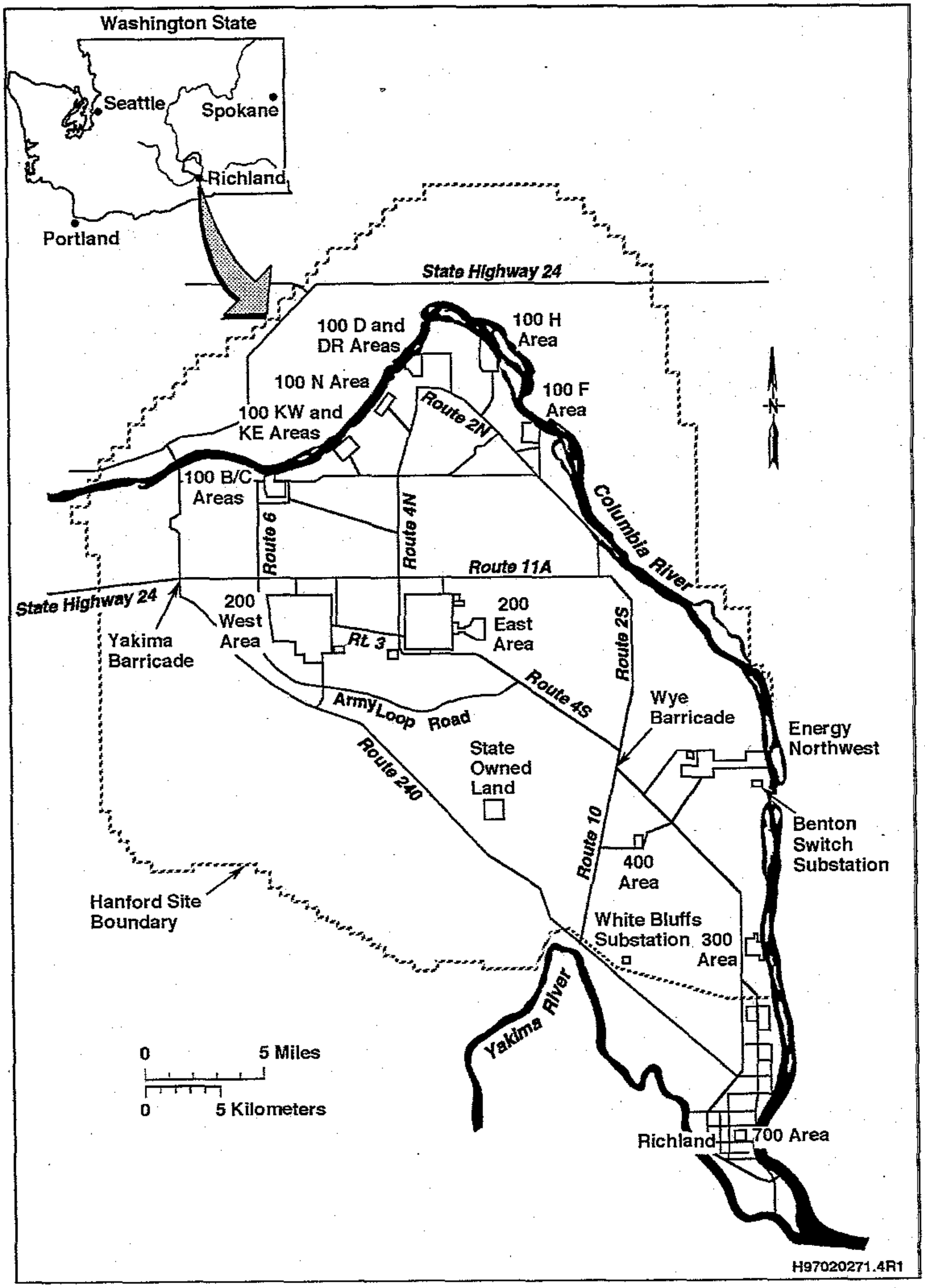
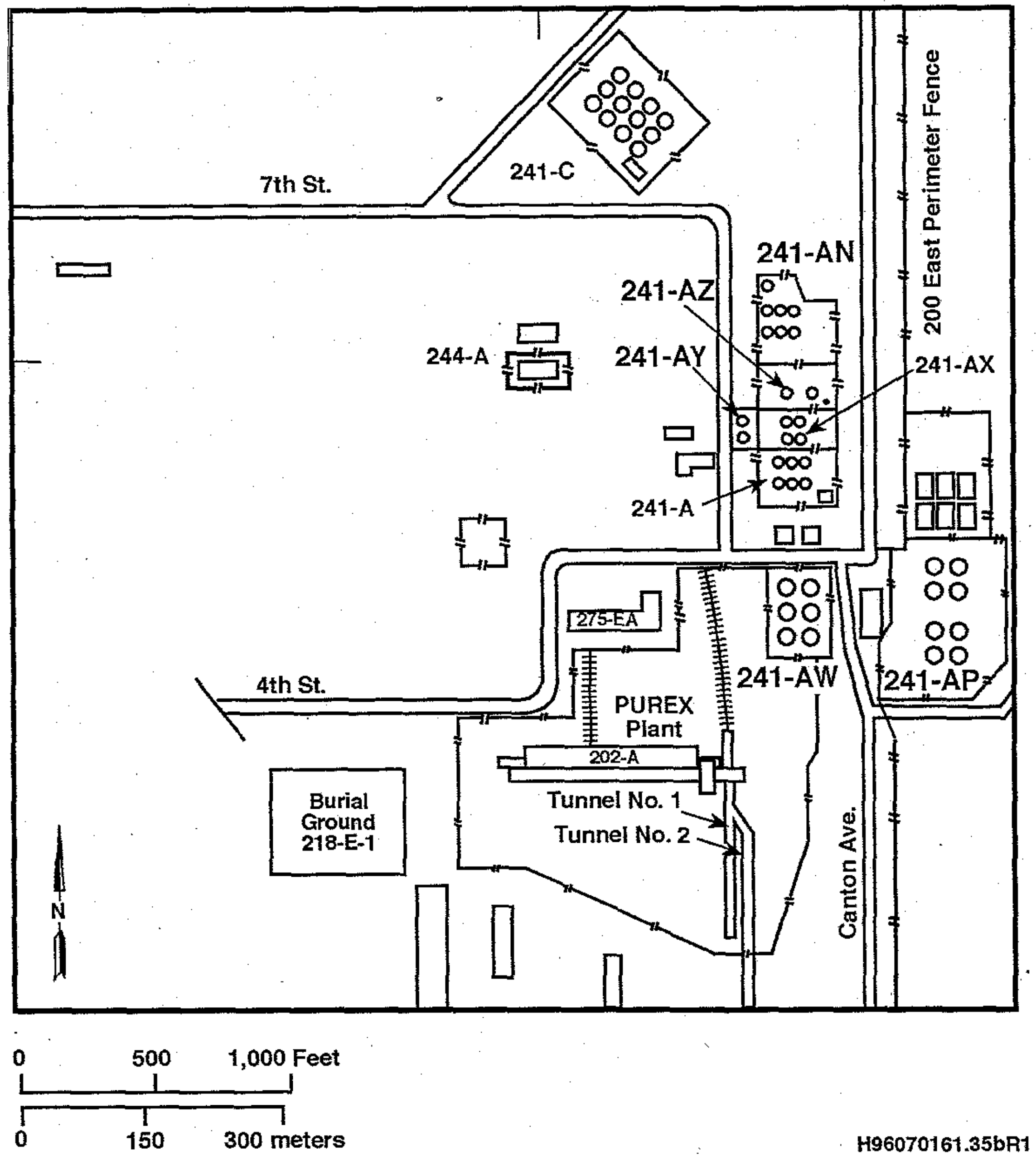


Figure 2. Location of AN and AW Tank Farms.



2.0 RESPONSIBLE MANAGER

Regulatory Citation: "Name, title, address, and phone number of responsible manager."

The responsible facility manager is:

Roy J. Schepens, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 450
Richland, Washington 99352
(509) 376-6677

3.0 PROPOSED ACTION

Regulatory Citation: "Identify the type of proposed action for which this application is submitted:

a. *Construction of new emission unit(s)*

b. *Modification of existing emission unit(s); identify whether this is a significant modification – significant means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of the proposed modification*

c. *Modification of existing unit(s), unregistered."*

This application is submitted for approval to modify the existing AN and AW Tank Farm Primary Ventilation System exhausters. Specifically, it is proposed that the existing exhausters, which are designed to operate at less than 0.47 m^3/s (1,000 ft^3/min), be replaced by systems that will operate from a nominal 0.47 m^3/s (1,000 standard ft^3/min) flow rate, during steady state storage, and up to 1.89 m^3/s (4,000 standard ft^3/min) during operational activities such as waste retrieval. The increased flow rate is due to recommendations that arose from the following studies:

- RPP-7171, *Thermal Hydraulic Evaluation for the 241-AN Tank Farm Primary Ventilation System*, Rev. 0.
- RPP-11731, *Thermal Hydraulic Evaluation for the 241-AW Tank Farm Primary Ventilation System*, Rev. 0.

The exhaust flow rate capacity will be increased for the following reasons:

- To mitigate any increase in temperatures because of mixer pump operation during retrieval operations.
- To maintain appropriate tank vacuum requirements because of increased waste transfer and maintenance activities expected to occur during retrieval activities.

The new exhaust system will have two exhaust fans each, per farm. For normal operations and most retrieval activities only one exhaust fan will operate. The second fan only will be used if necessary. Each two-fan exhauster system will not be operated above 1.89 m^3/s (4,000 standard ft^3/min).

The proposed actions addressed in this NOC include the following:

- Removal and disposal of the existing ventilation system
- Operation of the new ventilation system for the storage, treatment, retrieval, and disposal of the waste contained in the tanks; including transfer of waste to the WTP.

Potential unabated doses for use of the AN exhauster are estimated to be increased from 0.017 mrem/yr for the current exhauster to 690 mrem/yr for the new exhausters. This is a significant modification as defined by WAC 246-247-030(25), *Definitions*; " 'Significant' means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of the proposed modification."

Potential unabated doses for use of AW exhauster are estimated to be increased from 0.028 mrem/yr for the current exhauster to 640 mrem/yr for the new exhausters. This is a significant modification as defined by WAC 246-247-030(25).

4.0 STATE ENVIRONMENTAL POLICY ACT

Regulatory Citation: "If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number."

The proposed action is categorically exempt from the requirements of RCW 43.21C, "State Environmental Policy Act of 1971," *Revised Code of Washington*, as amended under WAC 197-11-845, "SEPA Rules," *Washington Administration Code*, as amended.

5.0 CHEMICAL AND PHYSICAL PROCESS

Regulatory Citation: "Describe the chemical and physical processes upstream of the emission unit(s)."

The 241-AN Double Shell Tank (DST) Farm consists of seven individual DSTs. The 241-AW DST Farm consists of six individual DSTs. DSTs are fabricated as two concentric tanks surrounded by a concrete shell. The inner tank (where the waste is stored) is 75 feet in diameter and has a 46.8-foot high crown. The maximum usable volume in each of the AN and AW tanks is 1.14×10^6 gal. The inner tank is surrounded by a two-and-one-half-foot annulus space. The waste stored in the inner tank consists of mixed wastes. Mixed waste includes hazardous components regulated under 42 USC 6901, *Resource Conservation and Recovery Act of 1976* and radioactive material regulated under 42 USC 2011, *Atomic Energy Act of 1954*. The DSTs are used for storage, treatment, retrieval, and disposal of the waste contained in the tanks. This includes transfer of waste to the WTP.

All seven AN Tank Farm tanks are ventilated through the AN Tank Farm primary ventilation system. All six AW Tank Farm tanks are ventilated through the AW Tank Farm primary ventilation system. These ventilation systems serve to remove heat, and serve as containment systems for radioactive particulates present in the tank headspaces, they ventilate/remove flammable gases and vapors that evolve from the liquid surface in the DSTs. Both ventilation systems do this by drawing outside air into the tanks vapor space. After the air leaves the vapor space, the air is conditioned by the ventilation system. It removes entrained moisture, the relative humidity is reduced, and particulates are filtered out. Before discharge of this air to the atmosphere from the stack, the air is monitored and sampled for radionuclide particulates.

6.0 EXISTING AND PROPOSED ABATEMENT TECHNOLOGY

Regulatory Citation: "Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters3/sec for the emission unit(s)."

6.1 Abatement Technology for the Existing Systems

The current system operates at less than 0.47 m^3/s (1,000 ft^3/min). It has a single stack with dual fans and dual high efficiency particulate air (HEPA) filter trains each containing two HEPA filters in series. The exhauster is designed to only operate one fan and one HEPA filter train at a time. Flow rate measurements from the AN Farm ventilation system during calendar year 2002 averaged 0.32 m^3/s (673 standard ft^3/min). Flow rate measurements from the AW Farm ventilation system during calendar year 2002 averaged 0.38 m3/s (815 standard ft^3/min). These values were used to estimate emissions reported in DOE/RL-2003-19, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002*. The abatement technology on these existing systems are described in RPP-9782, *ALARACT Demonstration for the Primary Ventilation Systems at the DST Tank Farms for the SST Interim Stabilization Project (Saltwell Pumping)*. Deviations to the technology standards cited in this document were approved (conditionally) in external letter AIR-02-706, A. W. Conklin, WDOH, to J. E. Rasmussen, ORP, dated July 22, 2002. The WDOH granted these deviations, provided the exhausters are upgraded on the schedule identified in DOE external letter 01-EQD-048, W. J. Pasciak, ORP, to A. W. Conklin, WDOH, "Response to the Washington State Department of Health (WDOH) Request for Schedule for Upgrading Double-Shell Tank (DST) Farms 241-SY, 241-AN, 241-AP, and 241-AW Exhauster," dated June 6, 2001. This NOC accomplishes the upgrade for the AN and AW Farms.

6.2 Abatement Technology for the New System

The new ventilation systems in the AN and AW Farm will operate up to a maximum flow rate of 1.89 m^3/s (4,000 standard ft^3/min). Each ventilation system will consist of two individual exhauster trains (fans and stacks), designed with a fan rating of 0.94 m^3/s (2,000 standard ft^3/min). This rating is based on design specifications that the system must be capable of producing flows up to 0.94 m^3/s (2,000 standard ft^3/min) at 150°F and 100% relative humidity. The actual fans have been designed to produce an air flow of up to 1.35 m^3/s (2,851 actual ft^3/min) at 170°F, at a relative humidity of 61%, and at a combined pressure at the fan inlet of 22.7 in. of water. At this capacity, it has been estimated that these fans will produce flows up to 1.00 m^3/s (2,120 standard ft^3/min) under the hottest operating temperatures, and with dirty pre-filters and HEPA filters.

The abatement technology for these new systems is described in HNF-6779, *Project Development Specification for HVAC* and RPP-7881, *Specification of a Primary Exhaust System for Waste Tank Ventilation.* These documents establish the performance, design development, and test requirements for ventilation systems. The major components of this ventilation system are:

- Moisture de-entrainment
- Heater
- HEPA filters
- Fans
- Exhaust stack
- Monitoring and control instruments and equipment.

These ventilation systems will be capable of providing individual tank exhaust flow rates of 0.24 m^3/s (500 ft^3/min), when the mixer pumps are operating. The system will be capable of maintaining the vapor space pressures of the tanks between –6.0 in w.g. and –0.3 in w.g. during normal operating conditions. Specific to tank 241-AN-107, the ventilation will be capable of maintaining vapor space pressure within the required range while the airlift circulators are operating at a maximum airflow rate of 0.09 m^3/s (200 ft^3/min).

These ventilation systems will remove particulates and moisture, collect condensate, and reduce relative humidity in the exhaust stream. Moisture will be entrained via a de-entrainer (moisture separator). The moisture separator will be designed, fabricated, and tested in accordance with ASME, 2001, *ASME Boiler and Pressure Vessel Code,* Section VIII, Division 1. Moisture separator performance will be in accordance with Table FA-4200-1 of ASME AG-1, *Code on Nuclear Air and Gas Treatment.*

These ventilation systems will reduce the relative humidity by heating the exhaust air stream before entering the HEPA filters. Air heater design analysis will verify that the heater system will prevent formation of condensate on or within any component or ductwork from the heater location to the emission point. It also will be verified that air stream temperatures are limited by allowable operating temperatures for components subjected to the air streams. Air heaters will be designed in accordance with ASME N509, Section 5.5; *Nuclear Power Plant Air Cleaning Units and Components* and ASME AG-1a, Section CA. Where there are conflicts in the standards, ASME AG-1 shall take precedence. The heater alarm set point will be set to annunciate at no greater than 167°F.

These ventilation systems will use HEPA filters qualified by the manufacturer to remove 99.97% of particulates greater than or equal to 0.3 µm when tested in accordance with ASME AG-1a, Section FC. The filters will be tested at the facility, in-place, to a pass/fail criterion of 99.95% per ERDA 76-21, Section 8.3.1, *Nuclear Air Cleaning Handbook.*

These ventilation exhaust trains will incorporate a pre-filter bank before the primary HEPA filters. A secondary HEPA filter bank will be incorporated in series with the primary HEPA filter bank. Each bank will consist of two high flow rate filters tested to 0.71 m^3/s (1,500 actual ft^3/min) each. Therefore, each bank will be capable of filtering flows up to 1.42 m^3/s (3,000 actual ft^3/min). This will make both trains capable of filtering up to a total flow of 2.83 m^3/s (6,000 actual ft^3/min). However, total flows will be allowed to go as high as 1.89 m^3/s (4,000 standard ft^3/min).

These ventilation systems will be designed and tested in accordance with ASME AG-1a. They will collect all condensate generated by system operation for return to a designated DST. A hot operational test of the new primary ventilation system will be performed. When the new ventilation systems are deemed operational, the old ventilation systems will be removed.

6.3 Abatement Technology for Removal of the Old Ventilation System

Controls established in As Low As Reasonably Achievable Control Technology (ALARACT) will be followed for removal of the old ventilation systems. Refer to:

ALARACT 12, *Tank Farm ALARACT Demonstration for Packaging and Transportation of Equipment and Vehicles*

ALARACT 15, *Tank Farm ALARACT Demonstration for Size Reduction of Waste Equipment for Disposal*

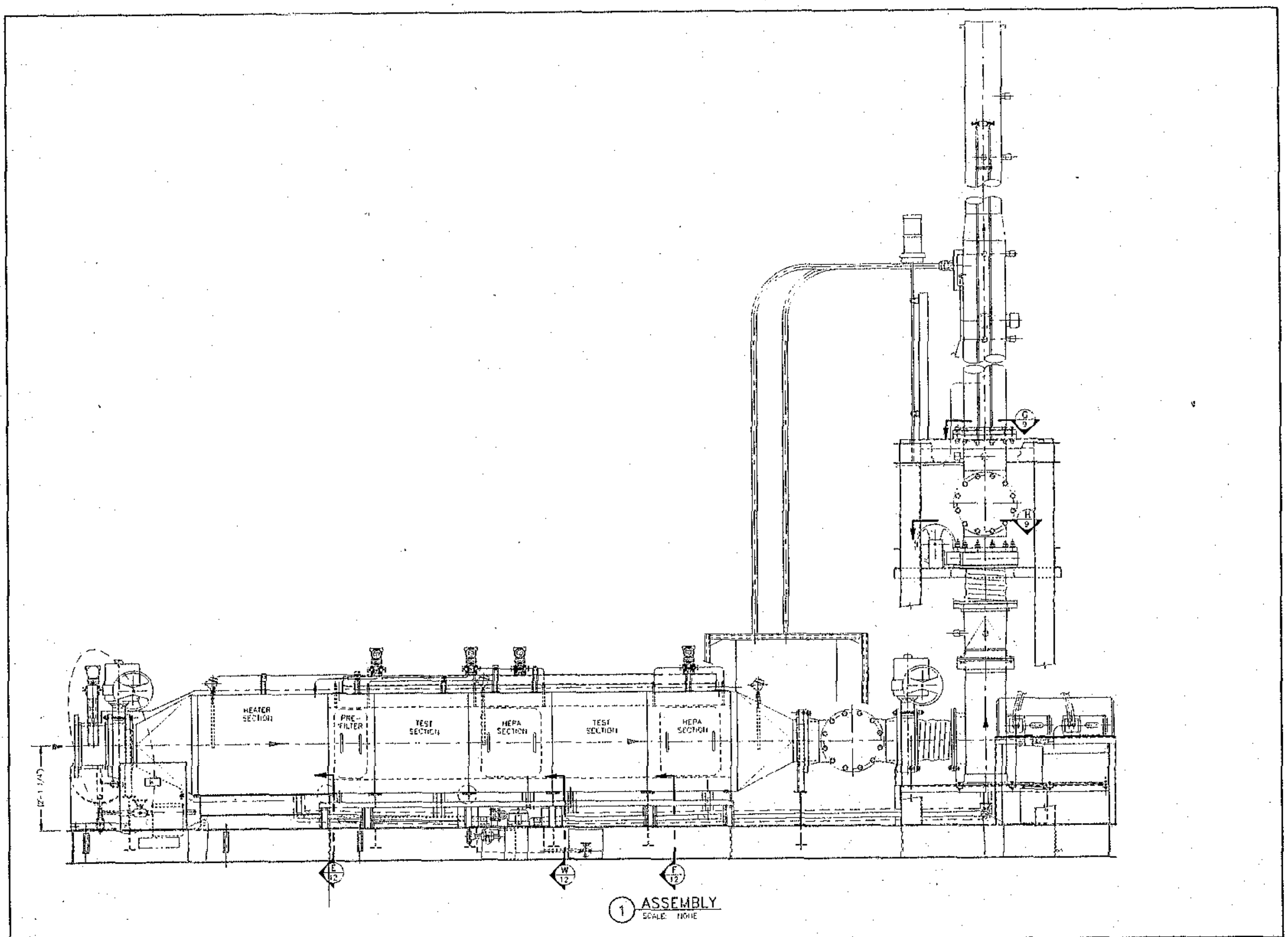
ALARACT 16, *Tank Farm ALARACT Demonstration for Work on Potentially Contaminated Ventilation System Components.*

7.0 APPLICABLE CONTROL TECHNOLOGY DRAWINGS

Regulatory Citation: "Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment."

Figure 3 is the new exhauster design, showing applicable control technology components, HEPA filters, and stack.

Figure 3. New Exhauster Details.



8.0 RADIONUCLIDES OF CONCERN – POTENTIAL EMISSIONS

Regulatory Citation: "Identify each radionuclide that could contribute greater than ten percent of the potential–to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential--to-emit TEDE to the MEI."

During operation of the new exhausters, radionuclide emissions estimated to contribute greater than 10% of the potential-to-emit TEDE to the MEI from operation of the new AN and AW Tank Farm ventilation system are ^{90}Sr, ^{137}Cs, and ^{241}Am. Emissions of those radionuclides estimated to contribute greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI are ^{14}C, ^{90}Y, ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{154}Eu, ^{227}Ac, ^{231}Pa, ^{233}U, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{241}Am, and ^{244}Cm.

9.0 EFFLUENT MONITORING SYSTEM

Regulatory Citation: "Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements."

9.1 Sampling and Monitoring System for the New Ventilation System

The new ventilation system will sample and monitor the ventilation emissions continuously. The system will collect a sample using a shrouded probe. The shrouded probe assembly will be installed in the 12-in. section of the stack. The shrouded probe installation location and the transport lines will be designed to adhere to the applicable requirements of ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities.*

As noted in Section 8.0, emissions of ^{90}Sr, ^{137}Cs, and ^{241}Am are estimated to contribute greater than 10% of the potential-to-emit TEDE to the MEI; potential emissions for ^{14}C, ^{90}Y, ^{90}Sr, ^{134}Cs, ^{137}Cs, ^{154}Eu, ^{227}Ac, ^{231}Pa, ^{233}U, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{241}Am, and ^{244}Cm are estimated to be greater than 0.1 mrem/yr to the MEI. Emissions of ^{14}C are estimated to contribute greater than 25% of the TEDE to the MEI after controls. The method used to arrive at these contributors is conservative. Therefore, except for ^{14}C, a representative sample of all other radionuclides of concern will be continuously collected in the record sampler system, of which will be transported and analyzed at the laboratory. Regarding ^{14}C, it is proposed that a sample of ^{14}C be collected quarterly and analyzed to determine its true contribution to the MEI. If analyses show that ^{14}C does contribute greater than 25% after controls, a ^{14}C continuous sampler will be installed.

Results of the analyses will be published in the following Hanford Site Annual Emission Reports. The quality of these analyses is discussed in the current revisions of these documents:

> HNF-EP-0528, *National Emission Standards for Hazardous Air Pollutants (NESHAP) Quality Assurance Project Plan for Radioactive Air Emissions*
>
> HNF-EP-0835-8, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program during Calendar Year 2002*
>
> RPP-QAPP-004, *CHG Quality Assurance Program Plan for Tank Farm Contractor Radioactive Air Emissions.*

9.2 Sampling and Monitoring During Removal of the Old Ventilation System

Monitoring during removal of the old ventilation system will be in accordance with ALARACT 12, ALARACT 15, ALARACT 16

10.0 RADIONUCLIDE ANNUAL POSSESSION QUANTITY

Regulatory Citation: "Indicate the annual possession quantity for each radionuclide."

10.1 Annual Possession Quantity for Operation of the New Ventilation Systems in AN and AW Tank Farms

The annual possession quantity (APQ) for operation of the new ventilation system is listed in Tables 3 and 4. These tables lists a possible maximum radionuclide inventory in AN and AW Farms respectively. This inventory was derived in the following manner:

> The data listed was derived from the Tank Waste Information Network System 3 (TWINS) data base, Best Basis Inventory, Best Basis Summary as of September 9, 2003.
>
> Radionuclides from all 177 single shell tanks (SSTs) and DSTs in the tank farm complex were compiled into a single spreadsheet. Then each radionuclide was sorted from highest to lowest. To account for all seven tanks in the AN Tank Farm, the seven highest quantities for each individual radionuclide was chosen. For the AW Farm inventory, the six highest quantities were chosen. These quantities were summed to arrive at an AN and an AW Farm APQ.

Table 3. AN Farm Annual Possession Quantity.

Radionuclide	APQ (Ci)		Radionuclide	APQ (Ci)
^{3}H	2.71E+03		^{226}Ra	2.38E+02
^{14}C	5.07E+02		^{227}Ac	1.30E+02
^{59}Ni	7.70E+02		^{228}Ra	3.87E+01
^{60}Co	4.46E+03		^{229}Th	2.49E+01
^{63}Ni	7.26E+04		^{231}Pa	2.70E+02
^{79}Se	5.70E+01		^{232}U	2.79E+01
^{90}Y	2.30E+07		^{232}Th	6.16E+00
^{90}Sr	2.30E+07		^{233}U	4.48E+02
^{93}Zr	1.86E+03		^{234}U	6.76E+01
^{93}mNb	1.82E+03		^{235}U	2.58E+00
^{99}Tc	6.89E+03		^{236}U	2.87E+00
^{106}Ru	1.02E+03		^{237}Np	6.20E+01
^{113}mCd	7.50E+03		^{238}Pu	3.04E+03
^{125}Sb	2.06E+04		^{238}U	5.61E+01
^{126}Sn	2.40E+02		^{239}Pu	2.92E+04
^{129}I	9.18E+00		^{240}Pu	5.25E+03
^{134}Cs	1.81E+04		^{241}Pu	6.40E+04
^{137}Cs	1.85E+07		^{241}Am	1.03E+05
^{137}mBa	1.75E+07		^{242}Pu	4.05E-01
^{151}Sm	1.53E+06		^{242}Cm	7.57E+01
^{152}Eu	1.06E+03		^{243}Am	1.37E+01
^{154}Eu	4.63E+04		^{243}Cm	8.35E+00
^{155}Eu	4.56E+04		^{244}Cm	2.36E+02

Table 4. AW Farm Annual Possession Quantity.

Radionuclide	APQ (Ci)		Radionuclide	APQ (Ci)
^{3}H	2.47E+03		^{226}Ra	2.38E+02
^{14}C	4.38E+02		^{227}Ac	1.29E+02
^{59}Ni	7.44E+02		^{228}Ra	3.65E+01
^{60}Co	4.13E+03		^{229}Th	2.49E+01
^{63}Ni	7.02E+04		^{231}Pa	2.70E+02
^{79}Se	5.38E+01		^{232}U	2.73E+01
^{90}Y	2.08E+07		^{232}Th	6.08E+00
^{90}Sr	2.08E+07		^{233}U	4.46E+02
^{93}Zr	1.80E+03		^{234}U	6.14E+01
^{93}mNb	1.77E+03		^{235}U	2.34E+00
^{99}Tc	6.09E+03		^{236}U	2.73E+00
^{106}Ru	1.02E+03		^{237}Np	5.81E+01
^{113}mCd	7.25E+03		^{238}Pu	2.95E+03
^{125}Sb	2.04E+04		^{238}U	5.06E+01
^{126}Sn	2.21E+02		^{239}Pu	2.71E+04
^{129}I	8.13E+00		^{240}Pu	4.86E+03
^{134}Cs	1.80E+04		^{241}Pu	6.00E+04
^{137}Cs	1.70E+07		^{241}Am	9.67E+04
^{137}mBa	1.61E+07		^{242}Pu	3.77E-01
^{151}Sm	1.48E+06		^{242}Cm	6.99E+01
^{152}Eu	1.01E+03		^{243}Am	1.34E+01
^{154}Eu	4.26E+04		^{243}Cm	7.29E+00
^{155}Eu	4.42E+04		^{244}Cm	2.25E+02

10.2 Annual Possession Quantity for Removal of the old AN and AW Farm Ventilation Systems

The annual possession quantity for removal of the old ventilation system in AN and AW Farms is listed in Tables 5 and 6. These inventories are those values transmitted in external letter 02-EMD-024, J. E. Rasmussen, ORP, to A. W. Conklin, WDOH, "Non-Destructive Analysis Results for the 241-AN, 241-AP, and 241-AW Tank Farms," dated March 5, 2002. These inventories are the inventories of radionuclides estimated (using the non-destructive analysis technique) to be contained within the respective ventilation systems.

Table 5. AN Farm Exhauster Removal Annual Possession Quantity. (2 sheets)

Analyte	Analyte to NDA Results Normalized Values (Ci)	Condensate Result (Ci)	Total Inventory (Ci)
^{3}H	7.77E-08	1.55E-04	1.55E-04
^{14}C	8.34E-08		8.34E-08
^{60}Co	7.75E-07		7.75E-07
^{59}Ni	7.92E-09		7.92E-09
^{63}Ni	7.50E-07		7.50E-07
^{79}Se	4.45E-09		4.45E-09
^{90}Sr	8.30E-04	1.72E-05	8.47E-04
^{90}Y	8.30E-04		8.30E-04
^{93}Zr	7.98E-08		7.98E-08
^{93}mNb	5.73E-08		5.73E-08
^{99}Tc	1.71E-06	3.20E-05	3.37E-05
^{106}Ru	3.48E-13		3.48E-13
^{113}mCd	3.16E-07		3.16E-07
^{126}Sn	2.83E-08		2.83E-08
^{125}Sb	1.74E-07		1.74E-07
^{129}I	1.46E-09		1.46E-09
^{134}Cs	2.46E-09		2.46E-09
^{137}Cs +D	3.10E-03	5.90E-02	6.21E-02
^{137}mBa	2.94E-03		2.94E-03
^{151}Sm	5.39E-05		5.39E-05
^{152}Eu	1.63E-08		1.63E-08
^{154}Eu	7.59E-06		7.59E-06
^{155}Eu	4.93E-06		4.93E-06
^{226}Ra	6.50E-13		6.50E-13
^{228}Ra	1.43E-09		1.43E-09
^{227}Ac	3.82E-12		3.82E-12
^{229}Th	3.32E-11		3.32E-11
^{232}Th	1.74E-10		1.74E-10
^{231}Pa	1.78E-11		1.78E-11
^{232}U	6.89E-10		6.89E-10
^{233}U	2.82E-09		2.82E-09
^{234}U	5.82E-10		5.82E-10
^{235}U	2.32E-11		2.32E-11
^{236}U	2.07E-11		2.07E-11
^{238}U	5.14E-10		5.14E-10
^{237}Np	5.93E-08		5.93E-08

Table 5. AN Farm Exhauster Removal Annual Possession Quantity. (2 sheets)

Analyte	Analyte to NDA Results Normalized Values (Ci)	Condensate Result (Ci)	Total Inventory (Ci)
^{238}Pu	1.93E-08		1.93E-08
^{239}Pu	3.84E-07		3.84E-07
^{240}Pu	6.78E-08		6.78E-08
^{241}Pu	6.28E-07		6.28E-07
^{242}Pu	4.70E-12		4.70E-12
^{241}Am	5.70E-06		5.70E-06
^{243}Am	2.33E-10		2.33E-10
^{242}Cm	1.44E-08		1.44E-08
^{243}Cm	1.19E-09		1.19E-09
^{244}Cm	8.31E-09		8.31E-09

NDA = nondestructive analysis.

Table 6. AW Farm Exhauster Removal Annual Possession Quantity. (2 sheets)

Analyte	Analyte to NDA Results Normalized Values (Ci)	Condensate Result (Ci)	Total Inventory (Ci)
^{3}H	1.29E-06	1.55E-04	1.56E-04
^{14}C	8.98E-07		8.98E-07
^{60}Co	2.10E-06		2.10E-06
^{59}Ni	9.79E-08		9.79E-08
^{63}Ni	9.26E-06		9.26E-06
^{79}Se	6.12E-08		6.12E-08
^{90}Sr	2.03E-03	1.72E-05	2.05E-03
^{90}Y	2.03E-03		2.03E-03
^{93}Zr	8.28E-07		8.28E-07
^{93}mNb	1.15E-06		1.15E-06
^{99}Tc	1.94E-05	3.20E-05	5.15E-05
^{106}Ru	1.01E-07		1.01E-07
^{113}mCd	4.56E-06		4.56E-06
^{126}Sn	1.40E-05		1.40E-05
^{125}Sb	1.78E-07		1.78E-07
^{129}I	2.65E-08		2.65E-08
^{134}Cs	3.19E-06		3.19E-06
^{137}Cs	4.00E-02	5.90E-02	9.90E-02

Table 6. AW Farm Exhauster Removal Annual Possession Quantity. (2 sheets)

Analyte	Analyte to NDA Results Normalized Values (Ci)	Condensate Result (Ci)	Total Inventory (Ci)
^{137m}Ba	3.79E-02		3.79E-02
^{151}Sm	7.79E-04		7.79E-04
^{152}Eu	2.40E-07		2.40E-07
^{154}Eu	8.91E-06		8.91E-06
^{155}Eu	2.35E-05		2.35E-05
^{226}Ra	9.56E-12		9.56E-12
^{228}Ra	2.07E-08		2.07E-08
^{227}Ac	5.51E-11		5.51E-11
^{229}Th	4.79E-10		4.79E-10
^{232}Th	1.88E-09		1.88E-09
^{231}Pa	2.58E-10		2.58E-10
^{232}U	3.26E-08		3.26E-08
^{233}U	1.33E-07		1.33E-07
^{234}U	4.51E-07		4.51E-07
^{235}U	1.72E-08		1.72E-08
^{236}U	3.60E-08		3.60E-08
^{238}U	3.14E-07		3.14E-07
^{237}Np	1.06E-07		1.06E-07
^{238}Pu	2.79E-06		2.79E-06
^{239}Pu	2.42E-05		2.42E-05
^{240}Pu	7.28E-06		7.28E-06
^{241}Pu	2.14E-04		2.14E-04
^{242}Pu	1.12E-09		1.12E-09
^{241}Am	1.66E-05		1.66E-05
^{243}Am	1.22E-09		1.22E-09
^{242}Cm	1.71E-08		1.71E-08
^{243}Cm	1.97E-09		1.97E-09
^{244}Cm	4.40E-08		4.40E-08

NDA = nondestructive analysis.

11.0 PHYSICAL FORM OF EACH RADIONUCLIDE IN THE INVENTORY

Regulatory Citation: "Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas."

The radionuclide in inventory listed in Tables 3 and 4 (pages 14 and 15 respectively) are contained in the tank waste, which consists of sludges and liquids. Radionuclides given as the inventory for removal of the old exhausters (Tables 5 and 6, pages 16 and 17 respectively) are particulate in nature.

12.0 RELEASE FORM OF EACH RADIONUCLIDE IN THE INVENTORY

Regulatory Citation: "Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known."

The radionuclides in the inventory listed in Tables 3 and 4 are all assumed to be released as particulate except for ^{3}H and ^{14}C. These are assumed to be released as gases.

13.0 RELEASE RATES

Regulatory Citation: "a. New emission unit(s): Give predicted release rates without any emission control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection 6 of this section.

b. Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection 6 of this section. Provide the latest year's emission data or emissions estimates.

In all cases, indicate whether the emission unit is operating in a batch or continuous mode."

13.1 Releases from the Current Exhauster

Abated (with controls) emissions from the existing AN and AW Farm Ventilation Systems (stacks 296-A-29 and 296-A-27 respectively) were reported in DOE/RL-2003-019, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002* as listed in Table 2 (page 2).

The AN Farm exhauster operated for a total of 8,709 hours in calendar year 2002 and the AW Farm exhauster operated for a total of 7314 hours in 2002. Therefore both exhausters operated in nearly a continuous mode.

Potential (without controls) emissions from the existing AN Farm Exhauster were estimated at 1.7×10^{-2} mrem/yr. Potential emissions from the existing AW Farm Exhauster were estimated at 2.8×10^{-2} mrem/yr. These estimates are documented in external letter 02-EMD-024.

13.2 Estimated Releases from the New Exhauster

Emission estimates from the new AN and AW exhausters are presented in Tables 7 and 8. Emissions were estimated using the most conservative release fraction values (8.0×10^{-5}) cited in PNNL-14467, *Preliminary Synopsis of Release Fraction Tests*, Judith Bamberger and John Glissmeyer. Unabated emissions were determined by applying this release factor directly to the APQ values listed in Tables 3 and 4 (pages 14 and 15). Abated emissions were determined by dividing the unabated results by 2,000, the usual HEPA filter decontamination factor that represents an in-place tested particulate removal efficiency of 99.95%. The decontamination factor was not used on ^{3}H or ^{14}C. For these radionuclides, the unabated emissions equal the abated emissions based on the assumption that the HEPA filters are not designed to control these types of emissions.

Table 7. Estimated AN Farm Exhauster Releases. (2 sheets)

	APQ (Ci)	Release Factor	Unabated Release (Ci)	Abated (1filter) (Ci)
^{3}H	2.71E+03	1.00E+00	2.71E+03	2.71E+03
^{14}C	5.07E+02	1.00E+00	5.07E+02	5.07E+02
^{59}Ni	7.70E+02	8.00E-05	6.16E-02	3.08E-05
^{60}Co	4.46E+03	8.00E-05	3.56E-01	1.78E-04
^{63}Ni	7.26E+04	8.00E-05	5.80E+00	2.90E-03
^{79}Se	5.70E+01	8.00E-05	4.56E-03	2.28E-06
^{90}Y	2.30E+07	8.00E-05	1.84E+03	9.20E-01
^{90}Sr	2.30E+07	8.00E-05	1.84E+03	9.20E-01
^{93}Zr	1.86E+03	8.00E-05	1.49E-01	7.46E-05
^{93}mNb	1.82E+03	8.00E-05	1.46E-01	7.28E-05
^{99}Tc	6.89E+03	8.00E-05	5.51E-01	2.75E-04
^{106}Ru	1.02E+03	8.00E-05	8.13E-02	4.06E-05
^{113}mCd	7.50E+03	8.00E-05	6.00E-01	3.00E-04
^{125}Sb	2.06E+04	8.00E-05	1.65E+00	8.24E-04
^{126}Sn	2.40E+02	8.00E-05	1.92E-02	9.58E-06
^{129}I	9.18E+00	8.00E-05	7.34E-04	3.67E-07
^{134}Cs	1.81E+04	8.00E-05	1.44E+00	7.22E-04
^{137}Cs	1.85E+07	8.00E-05	1.48E+03	7.40E-01
^{137}mBa	1.75E+07	8.00E-05	1.40E+03	7.00E-01

Table 7. Estimated AN Farm Exhauster Releases. (2 sheets)

	APQ (Ci)	Release Factor	Unabated Release (Ci)	Abated (1filter) (Ci)
^{151}Sm	1.53E+06	8.00E-05	1.22E+02	6.12E-02
^{152}Eu	1.06E+03	8.00E-05	8.45E-02	4.22E-05
^{154}Eu	4.63E+04	8.00E-05	3.70E+00	1.85E-03
^{155}Eu	4.56E+04	8.00E-05	3.65E+00	1.82E-03
^{226}Ra	2.38E+02	8.00E-05	1.90E-02	9.52E-06
^{227}Ac	1.30E+02	8.00E-05	1.04E-02	5.18E-06
^{228}Ra	3.87E+01	8.00E-05	3.10E-03	1.55E-06
^{229}Th	2.49E+01	8.00E-05	1.99E-03	9.97E-07
^{231}Pa	2.70E+02	8.00E-05	2.16E-02	1.08E-05
^{232}U	2.79E+01	8.00E-05	2.23E-03	1.12E-06
^{232}Th	6.16E+00	8.00E-05	4.93E-04	2.47E-07
^{233}U	4.48E+02	8.00E-05	3.59E-02	1.79E-05
^{234}U	6.76E+01	8.00E-05	5.41E-03	2.71E-06
^{235}U	2.58E+00	8.00E-05	2.07E-04	1.03E-07
^{236}U	2.87E+00	8.00E-05	2.29E-04	1.15E-07
^{237}Np	6.20E+01	8.00E-05	4.96E-03	2.48E-06
^{238}Pu	3.04E+03	8.00E-05	2.43E-01	1.22E-04
^{238}U	5.61E+01	8.00E-05	4.49E-03	2.25E-06
^{239}Pu	2.92E+04	8.00E-05	2.33E+00	1.17E-03
^{240}Pu	5.25E+03	8.00E-05	4.20E-01	2.10E-04
^{241}Pu	6.40E+04	8.00E-05	5.12E+00	2.56E-03
^{241}Am	1.03E+05	8.00E-05	8.24E+00	4.12E-03
^{242}Pu	4.05E-01	8.00E-05	3.24E-05	1.62E-08
^{242}Cm	7.57E+01	8.00E-05	6.06E-03	3.03E-06
^{243}Am	1.37E+01	8.00E-05	1.10E-03	5.48E-07
^{243}Cm	8.35E+00	8.00E-05	6.68E-04	3.34E-07
^{244}Cm	2.36E+02	8.00E-05	1.89E-02	9.43E-06

Table 8. Estimated AW Farm Exhauster Releases. (2 sheets)

	APQ (Ci)	Release Factor	Unabated Release (Ci)	Abated (1filter) (Ci)
^{3}H	2.47E+03	1.00E+00	2.47E+03	2.47E+03
^{14}C	4.38E+02	1.00E+00	4.38E+02	4.38E+02
^{59}Ni	7.44E+02	8.00E-05	5.96E-02	2.98E-05
^{60}Co	4.13E+03	8.00E-05	3.31E-01	1.65E-04
^{63}Ni	7.02E+04	8.00E-05	5.61E+00	2.81E-03
^{79}Se	5.38E+01	8.00E-05	4.31E-03	2.15E-06
^{90}Y	2.08E+07	8.00E-05	1.66E+03	8.32E-01
^{90}Sr	2.08E+07	8.00E-05	1.66E+03	8.32E-01
^{93}Zr	1.80E+03	8.00E-05	1.44E-01	7.18E-05
^{93}mNb	1.77E+03	8.00E-05	1.41E-01	7.07E-05
^{99}Tc	6.09E+03	8.00E-05	4.87E-01	2.44E-04
^{106}Ru	1.02E+03	8.00E-05	8.13E-02	4.06E-05
^{113}mCd	7.25E+03	8.00E-05	5.80E-01	2.90E-04
^{125}Sb	2.04E+04	8.00E-05	1.63E+00	8.17E-04
^{126}Sn	2.21E+02	8.00E-05	1.77E-02	8.86E-06
^{129}I	8.13E+00	8.00E-05	6.50E-04	3.25E-07
^{134}Cs	1.80E+04	8.00E-05	1.44E+00	7.22E-04
^{137}Cs	1.70E+07	8.00E-05	1.36E+03	6.80E-01
^{137}mBa	1.61E+07	8.00E-05	1.29E+03	6.43E-01
^{151}Sm	1.48E+06	8.00E-05	1.19E+02	5.93E-02
^{152}Eu	1.01E+03	8.00E-05	8.05E-02	4.03E-05
^{154}Eu	4.26E+04	8.00E-05	3.41E+00	1.70E-03
^{155}Eu	4.42E+04	8.00E-05	3.53E+00	1.77E-03
^{226}Ra	2.38E+02	8.00E-05	1.90E-02	9.52E-06
^{227}Ac	1.29E+02	8.00E-05	1.04E-02	5.18E-06
^{228}Ra	3.65E+01	8.00E-05	2.92E-03	1.46E-06
^{229}Th	2.49E+01	8.00E-05	1.99E-03	9.94E-07
^{231}Pa	2.70E+02	8.00E-05	2.16E-02	1.08E-05
^{232}U	2.73E+01	8.00E-05	2.18E-03	1.09E-06
^{232}Th	6.08E+00	8.00E-05	4.87E-04	2.43E-07
^{233}U	4.46E+02	8.00E-05	3.57E-02	1.78E-05
^{234}U	6.14E+01	8.00E-05	4.91E-03	2.45E-06
^{235}U	2.34E+00	8.00E-05	1.87E-04	9.37E-08
^{236}U	2.73E+00	8.00E-05	2.18E-04	1.09E-07
^{237}Np	5.81E+01	8.00E-05	4.65E-03	2.33E-06
^{238}Pu	2.95E+03	8.00E-05	2.36E-01	1.18E-04

Table 8. Estimated AW Farm Exhauster Releases. (2 sheets)

	APQ (Ci)	Release Factor	Unabated Release (Ci)	Abated (1filter) (Ci)
^{238}U	5.06E+01	8.00E-05	4.05E-03	2.03E-06
^{239}Pu	2.71E+04	8.00E-05	2.17E+00	1.08E-03
^{240}Pu	4.86E+03	8.00E-05	3.89E-01	1.94E-04
^{241}Pu	6.00E+04	8.00E-05	4.80E+00	2.40E-03
^{241}Am	9.67E+04	8.00E-05	7.73E+00	3.87E-03
^{242}Pu	3.77E-01	8.00E-05	3.01E-05	1.51E-08
^{242}Cm	6.99E+01	8.00E-05	5.59E-03	2.79E-06
^{243}Am	1.34E+01	8.00E-05	1.07E-03	5.36E-07
^{243}Cm	7.92E+00	8.00E-05	6.33E-04	3.17E-07
^{244}Cm	2.25E+02	8.00E-05	1.80E-02	8.99E-06

13.3 Estimated Releases from Removal of the Old Exhauster

The potential to emit (PTE) for removal of the old AN and AW exhausters are the values cited in external letter 02-EMD-024. These PTE estimates are based on the results of a nondestructive assay of the AN and AW exhausters. This estimate assumes that the entire radionuclide content contained within the old exhausters will be released during removal. For the AN exhauster, the PTE was cited as 1.7×10^{-2} mrem per year. For the AW exhauster, the PTE was cited as 2.8×10^{-2} mrem per year. The inventories available for release (that these PTEs represent) are given in Tables 5 and 6 (pages 16 and 17).

14.0 DISTANCES AND DIRECTION OF THE MAXIMUM EXPOSED INDIVIDUAL

Regulatory Citation: "Identify the MEI by distances and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit."

The MEI is determined using CAP-88 dispersion factors, which are derived for use on the Hanford Site and published in HNF-3602, *Calculating Potential-to-Emit Releases and Doses for FEMPs and NOCs*. Values, used for both the AN Tank Farm and the AW Tank Farm Ventilation systems are shown in Table 4-9, of HNF-3602, for 200 East Area with effective release height < 40 meters. Table 4-9 gives values in two separate columns for an offsite maximum public receptor (MPR) and an onsite MPR. Values from both columns were used to determine the maximum dose. The results showed that the maximum dose occurred to the offsite MPR. Table 4-2, of HNF-3602, states that the offsite MPR for the 200 East Area is 20,200 meters in the east southeast direction. This location is just east of the river, at Ringold.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMUM EXPOSED INDIVIDUAL

Regulatory Citation: "Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection 8 of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using release rates from subsection 13 of this section. Provide all input data used in the calculations."

The TEDE to the MEI, for purposes of this NOC, is estimated to be 1,330 mrem/yr without controls and 2.6 mrem/yr with controls. This estimate is summarized in Table 1 (page 1).

15.1 Estimated Emissions to the MEI from the New Exhauster

The TEDE to the MEI from the new AN and AW exhausters are presented in Tables 9 and 10. Emissions due to operation of the new AN and AW Farm ventilation, are estimated to be 690 and 640 mrem/yr respectively without controls. With controls, the emissions are estimated to be 1.4 and 1.2 mrem/yr respectively. CAP-88 dispersion factors were applied to the emission estimates. Both the offsite and onsite MPR values were used. After totaling the results, it was determined that the offsite results were higher. The percentage of each radionuclide was, therefore, determined from the offsite results. The abated emissions also were determined from the offsite results. Abated emissions were determined by dividing the unabated results by 2,000, the usual HEPA filter decontamination factor that represents an in-place tested particulate removal efficiency of 99.95 %. The decontamination factor was not used on ^{3}H or ^{14}C. For these radionuclides, the unabated emissions equal the abated emissions, based on the assumption that the HEPA filters are not effective controls for these types of emissions.

15.2 Estimated Emissions to the Maximum Exposed Individual from Removal of the Old Exhauster

The PTE for removal of the old AN and AW exhausters are the values cited in external letter 02-EMD-024. These PTE estimates are based on the results of a nondestructive assay of the AN and AW exhausters. This estimate assumes that the entire radionuclide content contained within the old exhausters will be released during removal. For the AN exhauster, the PTE was cited as 1.7×10^{-2} mrem/yr. For the AW exhauster, the PTE was cited as 2.8×10^{-2} mrem/yr.

Table 9. Unabated and Abated Dose to the Maximum Exposed Individual from the New AN Farm Exhauster. (2 sheets)

	APQ	Release Factor	Released	CAP-88 – East		Unabated Emissions		% Total Offsite	Abated Emissions	
				Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR		1 filter	% Total Abated
	Ci			mrem/Ci		mrem/yr				
^{3}H	2.71E+03	1.0E+00	2.7E+03	2.50E-05	7.10E-06	6.8E-02	1.9E-02	0.01%	6.8E-02	4.92%
^{14}C	5.07E+02	1.0E+00	5.1E+02	1.90E-03	1.80E-04	9.6E-01	9.1E-02	0.14%	9.6E-01	69.92%
^{59}Ni	7.70E+02	8.0E-05	6.2E-02	3.10E-04	2.90E-04	1.9E-05	1.8E-05	0.00%	9.6E-09	0.00%
^{60}Co	4.46E+03	8.0E-05	3.6E-01	2.50E-01	3.00E-01	8.9E-02	1.1E-01	0.01%	4.5E-05	0.00%
^{63}Ni	7.26E+04	8.0E-05	5.8E+00	2.60E-04	6.90E-05	1.5E-03	4.0E-04	0.00%	7.5E-07	0.00%
^{79}Se	5.70E+01	8.0E-05	4.6E-03	1.30E-01	1.50E-01	5.9E-04	6.8E-04	0.00%	3.0E-07	0.00%
^{90}Y	2.30E+07	8.0E-05	1.8E+03	3.40E-04	2.60E-04	6.3E-01	4.8E-01	0.09%	3.1E-04	0.02%
^{90}Sr	2.30E+07	8.0E-05	1.8E+03	1.10E-01	9.50E-03	2.0E+02	1.7E+01	29.18%	1.0E-01	7.35%
^{93}Zr	1.86E+03	8.0E-05	1.5E-01	1.30E-03	1.30E-03	1.9E-04	1.9E-04	0.00%	9.7E-08	0.00%
^{93}mNb	1.82E+03	8.0E-05	1.5E-01	2.10E-03	1.20E-03	3.1E-04	1.7E-04	0.00%	1.5E-07	0.00%
^{99}Tc	6.89E+03	8.0E-05	5.5E-01	2.30E-02	1.40E-03	1.3E-02	7.7E-04	0.00%	6.3E-06	0.00%
^{106}Ru	1.02E+03	8.0E-05	8.1E-02	2.00E-02	1.90E-02	1.6E-03	1.5E-03	0.00%	8.1E-07	0.00%
^{113}mCd	7.50E+03	8.0E-05	6.0E-01	1.30E-01	1.50E-01	7.8E-02	9.0E-02	0.01%	3.9E-05	0.00%
^{125}Sb	2.06E+04	8.0E-05	1.6E+00	2.60E-02	3.30E-02	4.3E-02	5.4E-02	0.01%	2.1E-05	0.00%
^{126}Sn	2.40E+02	8.0E-05	1.9E-02	4.70E-02	4.10E-02	9.0E-04	7.9E-04	0.00%	4.5E-07	0.00%
^{129}I	9.18E+00	8.0E-05	7.3E-04	2.00E-01	2.20E-02	1.5E-04	1.6E-05	0.00%	7.3E-08	0.00%
^{134}Cs	1.81E+04	8.0E-05	1.4E+00	1.00E-01	4.70E-02	1.4E-01	6.8E-02	0.02%	7.2E-05	0.01%
^{137}Cs	1.85E+07	8.0E-05	1.5E+03	2.40E-01	2.70E-01	3.6E+02	4.0E+02	51.23%	1.8E-01	12.91%
^{137}mBa	1.75E+07	8.0E-05	1.4E+03	5.30E-13	1.00E-11	7.4E-10	1.4E-08	0.00%	3.7E-13	0.00%
^{151}Sm	1.53E+06	8.0E-05	1.2E+02	7.50E-04	8.40E-04	9.2E-02	1.0E-01	0.01%	4.6E-05	0.00%
^{152}Eu	1.06E+03	8.0E-05	8.4E-02	2.40E-01	3.10E-01	2.0E-02	2.6E-02	0.00%	1.0E-05	0.00%
^{154}Eu	4.63E+04	8.0E-05	3.7E+00	2.00E-01	2.50E-01	7.4E-01	9.3E-01	0.11%	3.7E-04	0.03%
^{155}Eu	4.56E+04	8.0E-05	3.6E+00	8.00E-03	9.80E-03	2.9E-02	3.6E-02	0.00%	1.5E-05	0.00%
^{226}Ra	2.38E+02	8.0E-05	1.9E-02	4.60E-01	2.50E-01	8.8E-03	4.8E-03	0.00%	4.4E-06	0.00%
^{227}Ac	1.30E+02	8.0E-05	1.0E-02	1.50E+01	1.80E+01	1.6E-01	1.9E-01	0.02%	7.8E-05	0.01%

Table 9. Unabated and Abated Dose to the Maximum Exposed Individual from the New AN Farm Exhauster. (2 sheets)

	APQ	Release Factor	Released	CAP-88 – East		Unabated Emissions		% Total Offsite	Abated Emissions	
				Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR		1 filter	% Total Abated
	Ci			mrem/Ci		mrem/yr				
^{228}Ra	3.87E+01	8.0E-05	3.1E-03	1.90E-01	7.00E-02	5.9E-04	2.2E-04	0.00	2.9E-07	0.00
^{229}Th	2.49E+01	8.0E-05	2.0E-03	1.60E+01	2.00E+01	3.2E-02	4.0E-02	0.00	1.6E-05	0.00
^{231}Pa	2.70E+02	8.0E-05	2.2E-02	1.20E+01	1.40E+01	2.6E-01	3.0E-01	0.04	1.3E-04	0.01
^{232}U	2.79E+01	8.0E-05	2.2E-03	1.10E+01	1.30E+01	2.5E-02	2.9E-02	0.00	1.2E-05	0.00
^{232}Th	6.16E+00	8.0E-05	4.9E-04	8.00E+00	1.00E+01	3.9E-03	4.9E-03	0.00	2.0E-06	0.00
^{233}U	4.48E+02	8.0E-05	3.6E-02	3.10E+00	3.70E+00	1.1E-01	1.3E-01	0.02	5.6E-05	0.00
^{234}U	6.76E+01	8.0E-05	5.4E-03	3.10E+00	3.70E+00	1.7E-02	2.0E-02	0.00	8.4E-06	0.00
^{235}U	2.58E+00	8.0E-05	2.1E-04	3.00E+00	3.50E+00	6.2E-04	7.2E-04	0.00	3.1E-07	0.00
^{236}U	2.87E+00	8.0E-05	2.3E-04	2.90E+00	3.50E+00	6.7E-04	8.0E-04	0.00	3.3E-07	0.00
^{237}Np	6.20E+01	8.0E-05	5.0E-03	1.20E+01	1.40E+01	5.9E-02	6.9E-02	0.01	3.0E-05	0.00
^{238}Pu	3.04E+03	8.0E-05	2.4E-01	7.60E+00	8.90E+00	1.8E+00	2.2E+00	0.27	9.2E-04	0.07
^{238}U	5.61E+01	8.0E-05	4.5E-03	2.80E+00	3.30E+00	1.3E-02	1.5E-02	0.00	6.3E-06	0.00
^{239}Pu	2.92E+04	8.0E-05	2.3E+00	8.20E+00	9.50E+00	1.9E+01	2.2E+01	2.76	9.6E-03	0.69
^{240}Pu	5.25E+03	8.0E-05	4.2E-01	8.20E+00	9.50E+00	3.4E+00	4.0E+00	0.50	1.7E-03	0.13
^{241}Pu	6.40E+04	8.0E-05	5.1E+00	1.30E-01	1.50E-01	6.7E-01	7.7E-01	0.10	3.3E-04	0.02
^{241}Am	1.03E+05	8.0E-05	8.2E+00	1.30E+01	1.50E+01	1.1E+02	1.2E+02	15.44	5.4E-02	3.89
^{242}Pu	4.05E-01	8.0E-05	3.2E-05	7.80E+00	9.10E+00	2.5E-04	2.9E-04	0.00	1.3E-07	0.00
^{242}Cm	7.57E+01	8.0E-05	6.1E-03	4.10E-01	5.00E-01	2.5E-03	3.0E-03	0.00	1.2E-06	0.00
^{243}Am	1.37E+01	8.0E-05	1.1E-03	1.30E+01	1.50E+01	1.4E-02	1.6E-02	0.00	7.1E-06	0.00
^{243}Cm	8.35E+00	8.0E-05	6.7E-04	8.50E+00	1.00E+01	5.7E-03	6.7E-03	0.00	2.8E-06	0.00
^{244}Cm	2.36E+02	8.0E-05	1.9E-02	6.70E+00	8.00E+00	1.3E-01	1.5E-01	0.02	6.3E-05	0.00
Total						6.9E+02	5.7E+02		1.4E+00	

APQ = annual possession quantity.
MPR = maximum public receptor.

Table 10. Unabated and Abated Dose to the Maximum Exposed Individual from the New AW Farm Exhauster. (2 sheets)

	APQ	Release Factor	Released	CAP-88 – East		Unabated Emissions		% Total Offsite	Abated Emissions	
				Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR		1 filter	% Total Abated
	Ci			mrem/Ci		mrem/yr				
^{3}H	2.47E+03	1.0E+00	2.5E+03	2.50E-05	7.10E-06	6.2E-02	1.8E-02	0.01	6.2E-02	5.08
^{14}C	4.38E+02	1.0E+00	4.4E+02	1.90E-03	1.80E-04	8.3E-01	7.9E-02	0.13	8.3E-01	68.69
^{59}Ni	7.44E+02	8.0E-05	6.0E-02	3.10E-04	2.90E-04	1.8E-05	1.7E-05	0.00	9.2E-09	0.00
^{60}Co	4.13E+03	8.0E-05	3.3E-01	2.50E-01	3.00E-01	8.3E-02	9.9E-02	0.01	4.1E-05	0.00
^{63}Ni	7.02E+04	8.0E-05	5.6E+00	2.60E-04	6.90E-05	1.5E-03	3.9E-04	0.00	7.3E-07	0.00
^{79}Se	5.38E+01	8.0E-05	4.3E-03	1.30E-01	1.50E-01	5.6E-04	6.5E-04	0.00	2.8E-07	0.00
^{90}Y	2.08E+07	8.0E-05	1.7E+03	3.40E-04	2.60E-04	5.7E-01	4.3E-01	0.09	2.8E-04	0.02
^{90}Sr	2.08E+07	8.0E-05	1.7E+03	1.10E-01	9.50E-03	1.8E+02	1.6E+01	28.73	9.1E-02	7.55
^{93}Zr	1.80E+03	8.0E-05	1.4E-01	1.30E-03	1.30E-03	1.9E-04	1.9E-04	0.00	9.3E-08	0.00
^{93}mNb	1.77E+03	8.0E-05	1.4E-01	2.10E-03	1.20E-03	3.0E-04	1.7E-04	0.00	1.5E-07	0.00
^{99}Tc	6.09E+03	8.0E-05	4.9E-01	2.30E-02	1.40E-03	1.1E-02	6.8E-04	0.00	5.6E-06	0.00
^{106}Ru	1.02E+03	8.0E-05	8.1E-02	2.00E-02	1.90E-02	1.6E-03	1.5E-03	0.00	8.1E-07	0.00
^{113}mCd	7.25E+03	8.0E-05	5.8E-01	1.30E-01	1.50E-01	7.5E-02	8.7E-02	0.01	3.8E-05	0.00
^{125}Sb	2.04E+04	8.0E-05	1.6E+00	2.60E-02	3.30E-02	4.2E-02	5.4E-02	0.01	2.1E-05	0.00
^{126}Sn	2.21E+02	8.0E-05	1.8E-02	4.70E-02	4.10E-02	8.3E-04	7.3E-04	0.00	4.2E-07	0.00
^{129}I	8.13E+00	8.0E-05	6.5E-04	2.00E-01	2.20E-02	1.3E-04	1.4E-05	0.00	6.5E-08	0.00
^{134}Cs	1.80E+04	8.0E-05	1.4E+00	1.00E-01	4.70E-02	1.4E-01	6.8E-02	0.02	7.2E-05	0.01
^{137}Cs	1.70E+07	8.0E-05	1.4E+03	2.40E-01	2.70E-01	3.3E+02	3.7E+02	51.26	1.6E-01	13.46
^{137}mBa	1.61E+07	8.0E-05	1.3E+03	5.30E-13	1.00E-11	6.8E-10	1.3E-08	0.00	3.4E-13	0.00
^{151}Sm	1.48E+06	8.0E-05	1.2E+02	7.50E-04	8.40E-04	8.9E-02	1.0E-01	0.01	4.4E-05	0.00
^{152}Eu	1.01E+03	8.0E-05	8.1E-02	2.40E-01	3.10E-01	1.9E-02	2.5E-02	0.00	9.7E-06	0.00
^{154}Eu	4.26E+04	8.0E-05	3.4E+00	2.00E-01	2.50E-01	6.8E-01	8.5E-01	0.11	3.4E-04	0.03
^{155}Eu	4.42E+04	8.0E-05	3.5E+00	8.00E-03	9.80E-03	2.8E-02	3.5E-02	0.00	1.4E-05	0.00
^{226}Ra	2.38E+02	8.0E-05	1.9E-02	4.60E-01	2.50E-01	8.8E-03	4.8E-03	0.00	4.4E-06	0.00

Table 10. Unabated and Abated Dose to the Maximum Exposed Individual from the New AW Farm Exhauster. (2 sheets)

	APQ	Release Factor	Released	CAP-88 - East		Unabated Emissions		% Total OffSite	Abated Emissions	
				Offsite MPR	OnSite MPR	Offsite MPR	OnSite MPR		1 filter	% Total Abated
	Ci			mrem/Ci		mrem/yr				
^{227}Ac	1.29E+02	8.0E-05	1.0E-02	1.50E+01	1.80E+01	1.6E-01	1.9E-01	0.02	7.8E-05	0.01
^{228}Ra	3.65E+01	8.0E-05	2.9E-03	1.90E-01	7.00E-02	5.6E-04	2.0E-04	0.00	2.8E-07	0.00
^{229}Th	2.49E+01	8.0E-05	2.0E-03	1.60E+01	2.00E+01	3.2E-02	4.0E-02	0.00	1.6E-05	0.00
^{231}Pa	2.70E+02	8.0E-05	2.2E-02	1.20E+01	1.40E+01	2.6E-01	3.0E-01	0.04	1.3E-04	0.01
^{232}U	2.73E+01	8.0E-05	2.2E-03	1.10E+01	1.30E+01	2.4E-02	2.8E-02	0.00	1.2E-05	0.00
^{232}Th	6.08E+00	8.0E-05	4.9E-04	8.00E+00	1.00E+01	3.9E-03	4.9E-03	0.00	1.9E-06	0.00
^{233}U	4.46E+02	8.0E-05	3.6E-02	3.10E+00	3.70E+00	1.1E-01	1.3E-01	0.02	5.5E-05	0.00
^{234}U	6.14E+01	8.0E-05	4.9E-03	3.10E+00	3.70E+00	1.5E-02	1.8E-02	0.00	7.6E-06	0.00
^{235}U	2.34E+00	8.0E-05	1.9E-04	3.00E+00	3.50E+00	5.6E-04	6.6E-04	0.00	2.8E-07	0.00
^{236}U	2.73E+00	8.0E-05	2.2E-04	2.90E+00	3.50E+00	6.3E-04	7.6E-04	0.00	3.2E-07	0.00
^{237}Np	5.81E+01	8.0E-05	4.7E-03	1.20E+01	1.40E+01	5.6E-02	6.5E-02	0.01	2.8E-05	0.00
^{238}Pu	2.95E+03	8.0E-05	2.4E-01	7.60E+00	8.90E+00	1.8E+00	2.1E+00	0.28	9.0E-04	0.07
^{238}U	5.06E+01	8.0E-05	4.1E-03	2.80E+00	3.30E+00	1.1E-02	1.3E-02	0.00	5.7E-06	0.00
^{239}Pu	2.71E+04	8.0E-05	2.2E+00	8.20E+00	9.50E+00	1.8E+01	2.1E+01	2.79	8.9E-03	0.73
^{240}Pu	4.86E+03	8.0E-05	3.9E-01	8.20E+00	9.50E+00	3.2E+00	3.7E+00	0.50	1.6E-03	0.13
^{241}Pu	6.00E+04	8.0E-05	4.8E+00	1.30E-01	1.50E-01	6.2E-01	7.2E-01	0.10	3.1E-04	0.03
^{241}Am	9.67E+04	8.0E-05	7.7E+00	1.30E+01	1.50E+01	1.0E+02	1.2E+02	15.79	5.0E-02	4.15
^{242}Pu	3.77E-01	8.0E-05	3.0E-05	7.80E+00	9.10E+00	2.3E-04	2.7E-04	0.00	1.2E-07	0.00
^{242}Cm	6.99E+01	8.0E-05	5.6E-03	4.10E-01	5.00E-01	2.3E-03	2.8E-03	0.00	1.1E-06	0.00
^{243}Am	1.34E+01	8.0E-05	1.1E-03	1.30E+01	1.50E+01	1.4E-02	1.6E-02	0.00	7.0E-06	0.00
^{243}Cm	7.92E+00	8.0E-05	6.3E-04	8.50E+00	1.00E+01	5.4E-03	6.3E-03	0.00	2.7E-06	0.00
^{244}Cm	2.25E+02	8.0E-05	1.8E-02	6.70E+00	8.00E+00	1.2E-01	1.4E-01	0.02	6.0E-05	0.00
Total						6.4E+02	5.3E+02		1.2E+00	

APQ = annual possession quantity.
MPR = maximum public receptor.

16.0 COST FACTORS/BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY OR AS LOW AS REASONABLY ACHIEVEABLE CONTROL TECHNOLOGY DEMONSTRATION

Regulatory Citation: "Provide cost factors for construction, operating, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC."

Pursuant to WAC 246-247-110, App. A (16), *Application Information Requirements*, cost factors for construction, operation, and maintenance of proposed technology requirements are not required, because the WDOH has provided guidance that HEPA filters generally are best available radionuclide control technology (BARCT) for particulate emissions (external letter AIR 92-107, A. W. Conklin, WDOH, to J. D. Bauer, RL, "Surveillance Report Generated by the DOH of KE and KW Basin on 09/16/1992," dated October 5, 1992). Because the radionuclides of concern are particulates, it is proposed that the HEPA filter controls described in Section 6.0 be accepted as BARCT. Compliance with the substantive BARCT technology standards is described in Section 18.0.

17.0 FACILITY PROCESS ESTIMATED LIFETIME

Regulatory Citation: "Provide an estimate of the lifetime for the facility process with the emission rates provided in this application."

Removal of the old AN and AW exhausters, once the work has begun, is expected to take no longer than six months each. The new ventilation systems are designed for continuous operation for over 35 years, with the exception of consumable materials.

18.0 CONTROL TECHNOLOGY STANDARDS

Regulatory Citation: "Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application:....

ASME AG-1, ASME N509, ASME N510, ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1"

These ventilation systems are designed to meet the required WAC-246-247-110 control technology standards as described in Section 18.1.

18.1 Abatement Technology Standards for the New Ventilation System

The required abatement technology standards are: ASME AG-1, ASME N509, and ASME N510, *Testing of Nuclear Air Treatment Systems*.

The abatement technology for the new ventilation system is described in HNF-6779. This ventilation system will be designed to meet the cited codes and standards as follows:

The exhauster skid ducting, filters, demister pad, valves, and fan will meet the applicable design, construction, and testing requirements contained in ASME AG-1a, ASME N509, and ASME N510, *Testing of Nuclear Air Treatment Systems*. Where there are conflicts in standards, ASME AG-1a shall take precedence.

The system ductwork will meet the requirements of ASME N509, Section 5.10, and ASME AG-1a, Section SA. Where there are conflicts in standards, ASME AG-1a will take precedence.

The primary tank offgas piping, valves, and condensate drain lines will meet the applicable requirements for design and construction contained in ASME B31.3, *Process Piping*.

All sections of the condensate piping construction (except tie-in to the ventilation system) will be fully welded construction. The condensate drain line will be fabricated from 300 series stainless steel material. Ventilation condensate lines will be designed, fabricated, and inspected per ASME B31.3.

The primary ventilation system will be designed using the materials specified in ASME AG-1a and ASME N509. Where there are conflicts in standards, ASME AG-1a will take precedence.

The primary ventilation exhaust fan and drives will meet requirements of ASME AG-1a, Section BA, ASME N509, Sections 5.7 and 5.8, and AMCA 99, *Standards Handbook*. Where there are conflicts in standards, ASME AG-1a will take precedence. The fans will be tested and certified in accordance with ASHRAE 51-85, *Laboratory Methods of Testing Fans for Rating*" and AMCA 210-85, *Laboratory Methods of Testing Fans for Rating*.

The HEPA filters will meet the applicable performance, design, construction, acceptance testing, and quality assurance requirements in ASME AG-1a, Section FC.

The filter housings and housing supports will meet the applicable design performance, fabrication, inspection, acceptance testing, and quality assurance requirements of ASME AG-1a, Section Ha, and ASME N509, Section 5.6. Where there are conflicts in standards, ASME AG-1a will take precedence.

The heating coils, exposed to DST vapor space airflow, will utilize a liquid heat transfer medium and will be designed, manufactured, and tested to meet applicable requirements of ASME AG-1a, Section CA, and ASME N509, Section 5.5. Where there are conflicts in standards, ASME AG-1a will take precedence.

The ASME AG-1 portions of the system shall be tested in accordance with the methods described in ASME AG-1 and ASME N510 to verify compliance with the requirements.

of ASME N509. The ASME B31.3 and ASME Section VIII, Division 1 portions of the system shall be tested and examined in accordance with these codes.

18.2 Quality Assurance for the New Ventilation System

The required technology standard is ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*. Quality assurance for the ventilation system will be performed in accordance with the current revision of TFC-PLN-02, *Quality Assurance Program Description.*

18.3 Stack Volumetric Flow Rate Determination Methods for the New Ventilation System

Required technology standards that address volumetric flow rates are discussed in this section. Stack effluent flow rates are necessary to compile emissions and complete the required annual reports. Requirements for flow rates can be broken into three areas of discussion:

1. Measurements Location: The regulatory methods that specify the measurement location, distances from flow disturbances, and number of measurements to take, are provided in the following two methods:

   40 CFR 60, Appendix A, Methods 1 – "Sample and Velocity Traverses for Stationary Sources."

   40 CFR 60, Appendix A, Methods 1A – "Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts."

   Discussion: The difference between these two methods is that one is for stacks 12- in. in diameter and larger, and the other is for under 12 in. The stacks are designed to extend 24 ft 10 in above the bottom of the skid. The stack consists of a 12-in. schedule-40 pipe section where a radionuclide particulate shrouded sampling probe will be installed. Above that the stack necks down to a 10-in. schedule-40 pipe section. Flow measurements will be taken from two 1-in. ports located 90° apart, 10 in. below an installed veribar flow sensor and 78 in. above the bottom of the 12-to-10-in. stack transition section. This location is in accordance with Method 1A.

2. Measurement Method: The regulatory methods that specify the measurement method and instrumentation to use are as follows:

   40 CFR 60, Appendix A, Methods 2 – *Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)*

   40 CFR 60, Appendix A, Methods 2A – *Direct Measurement of Gas Volume Through Pipes and Small Ducts*

   40 CFR 60, Appendix A, Methods 2C – *Determination of Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube)*. This

method is applicable for the determination of average velocity and volumetric flow rate of gas streams in small stacks or ducts.

40 CFR 60, Appendix A, Methods 2D – *Measurement of Gas Volume Flow Rates in Small Pipes and Ducts.*

Discussion: Either Method 2 or Method 2C are used in tank farms. The primary difference between Method 2 and 2C is that Method 2 is applicable for stacks larger than 12 in. in diameter, while 2C applies to stacks smaller than 12 in. Additionally, Method 2 uses an S-type pitot tube, but does allow for a standard type pitot tube. Standard type pitot tubes are used throughout the tank farms.

The stack flow measurement will be taken using a written procedure patterned after Method 2C. A standard pitot tube will be used.

3. Measurement Result: Flow rates are to be reported in dry standard units of temperature and pressure. This means that the moisture content of the air stream must be considered when finalizing the flow rate values. Method 2 and Method 2C (through reference to Method 2) call for the use of the following method for this determination:

40 CFR 60, A, Methods 4 – *Determination of Moisture Content in Stack Gases.* This method is applicable to determination of moisture content in stack gas. This method is called out for use in Method 2 and 2C (through call out of Method 2). Method 2 requires that flow rates be converted to dry standard units.

Discussion: This method is not used, however. Instead a humidity probe is used to determine moisture content of the stream. The humidity value determined from this instrument is mathematically incorporated into the final flow rate measurement.

In addition to the methods just discussed; 40 CFR 52, Appendix E, *Performance Specifications and, Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flow Rate* is also used. The methods discussed in this section are for manual measurements. The Appendix E method allows for the installation and operation of instrumentation to automatically and continuously take flow rate measurements. The Appendix E method requires use of Method 2 for use in comparison of the instrumentation readings and if after a series of measurements are taken the instrument accuracy is determined to be within that specified by the Appendix E method, the instrumentation is considered acceptable and can be used for flow rate determination and emission reporting purposes.

These ventilation systems will be tested to Appendix E.

18.4 Sampling System Design Methods and Standards

Methods and standards specified for sampling system design are as follows:

40 CFR 60, Appendix A, Methods 5 – *Determination of Particulate Matter Emissions from Stationary Sources*. This method is applicable for the determination of particulate

emissions. This method details the sample probe, collection filter and holder, the vacuum system, and instrumentation that might be used in the design of a particulate sample collection system.

40 CFR 60, Appendix A, Methods 17 – *Determination of Particulate Matter Emissions from Stationary Sources*. This method is applicable for determination of particulate matter emissions, where particulate matter concentrations are known to be independent of temperature over the normal range of temperatures characteristic of emissions from a specified source category. It is intended for use only when specified by an applicable subpart of the standards, and only within the applicable temperature limits (if specified), or when otherwise approved by the administrator. There are other provisions for use of this method. This method details the sample probe, collection filter and holder, the vacuum system, and instrumentation that might be used in the design of a particulate sample collection system.

ANSI N13.1-1969, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities.*

ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities.*

Discussion: No attempts have been made to design the sampling and monitoring system to Methods 5 and 17. Instead, the system has been designed to meet the intent of ANSI/HPS N13.1-1999. As discussed in this section, a shrouded probe assembly will be installed in the 12-in. section of the stack. The installation location, as well as the shrouded probe assembly, to include transport lines, will be qualified per the applicable requirements of ANSI/HPS N13.1-1999.

19.0 REFERENCES

00-05-006, 2001, *Hanford Air Operating Permit*, Washington State Department of Ecology, Olympia, Washington.

40 CFR 52, "Approval and Promulgation of Implementation Plans," *Code of Federal Regulations*, as amended.

40 CFR 60, "Standards for Performance of New Stationary Sources," *Code of Federal Regulations*, as amended.

40 CFR 61, "National Emission Standards for Hazardous Air Pollutant," *Code of Federal Regulations*, as amended.

42 USC 2011, *Atomic Energy Act of 1954*, et seq.

42 USC 4321, *National Environmental Policy Act of 1969*, et seq.

42 USC 6901, *Resource Conservation and Recovery Act of 1976*, et seq.

AMCA 99, 1999, *Standards Handbook*, Air Movement and Control Association International, Inc., Arlington Heights, Illinois.

AMCA 210-85, 1985, *Laboratory Methods of Testing Fans for Rating*, Air Movement and Control Association International, Inc., Arlington Heights, Illinois.

ANSI N13.1, 1969, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*, American National Standards Institute, New York, New York.

ANSI/HPS N13.1, 1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from Stacks and Ducts of Nuclear Facilities*, American National Standards Institute/Health Physics Society, New York, New York.

ASHRAE 51-85, *Laboratory Methods of Testing Fans for Rating*, American Society of Heating, Refrigeration, and Air Conditioning Engineers, New York, New York.

ASME, 2001, *ASME Boiler and Pressure Vessel Code*, Section VIII, Division 1, American Society of Mechanical Engineers, New York, New York.

ASME AG-1, 1997, *Code on Nuclear Air and Gas Treatment*, American Society of Mechanical Engineers, New York, New York.

ASME B31.3, 1999, *Process Piping*, American Society of Mechanical Engineers, New York, New York.

ASME N509, 1989, *Nuclear Power Plant Air Cleaning Units and Components*, American Society of Mechanical Engineers, New York, New York.

ASME N510, 1989, *Testing of Nuclear Air Treatment Systems*, American National Standards Institute, New York, New York.

ASME NQA-1, 1989, *Quality Assurance Program Requirements for Nuclear Facilities*, American Society of Mechanical Engineers, New York, New York.

DOE/RL-2003-19, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002*, latest revision, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

ERDA 76-21, 1979, *Nuclear Air Cleaning Handbook*, "Design, Construction, and Testing of High-Efficiency Air Cleaning Systems for Nuclear Applications," Oak Ridge National Laboratory, Oak Ridge Tennessee.

External Letter AIR-02-706, A. W. Conklin, WDOH, to J. E. Rasmussen, ORP, dated July 22, 2002.

External Letter AIR 03-602,A. W. Conklin, WDOH, to J. Hebdon, RL, and J. E. Rasmussen, ORP, dated June 3, 2003.

External Letter AIR 03-712, A. W. Conklin, WDOH, to J. Hebdon, RL, and J. E. Rasmussen, ORP, dated August 01, 2003.

External Letter AIR 92-107, A. W. Conklin, WDOH, to J. D. Bauer, RL, "Surveillance Report Generated by the DOH of KE and KW Basin on 09/16/1992," dated October 5, 1992.

External Letter 02-EMD-024, J. E. Rasmussen, ORP, to A. W. Conklin, WDOH, "Non-Destructive Analysis Results for the 241-AN, 241-AP, and 241-AW Tank Farms," dated March 5, 2002.

External Letter 01-EQD-048, W. J. Pasciak, ORP, to A. W. Conklin, WDOH, "Response to the Washington State Department of Health (WDOH) Request for Schedule for Upgrading Double-Shell Tank (DST) Farms 241-SY, 241-AN, 241-AP, and 241-AW Exhauster," dated June 6, 2001.

HNF-6779, 2002, *Project Development Specification for HVAC*, Rev. 0, Numatec Hanford Corporation, Richland, Washington.

HNF-3602, 2002, "*Calculating Potential-to-Emit Release and Dose for FEMP and NOCs*," Revision 1, Fluor Hanford Group Inc., Richland, Washington.

HNF-EP-0528, *National Emission Standards for Hazardous Air Pollutants (NESHAP) Quality Assurance Project Plan for Radioactive Airborne Emissions*, latest revision, Fluor Hanford, Inc., Richland, Washington.

HNF-EP-0835-8, 2002, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program during Calendar Year 2002*, Fluor Hanford, Inc., Richland, Washington.

RCW 43.21C, "State Environmental Policy Act of 1971," *Revised Code of Washington*, as amended.

PNNL-14467, *Preliminary Synopsis of Release Fraction Tests*, Pacific Northwest National Laboratory, Richland, Washington.

RPP-7171, 2001, *Thermal Hydraulic Evaluation for the 241-AN Tank Farm Primary Ventilation System*, Rev. 0, CH2M Hill Hanford Group Inc., Richland, Washington.

RPP-7881, 2002, *Specification of a Primary Exhauster System for Waste Tank Ventilation*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-9782, 2002, *ALARACT Demonstration for the Primary Ventilation Systems at the DST Tank Farms for the SST Interim Stabilization Project (Saltwell Pumping)*, Rev. 1, CH2M HILL Hanford Group, Inc., Richland, Washington.

ALARACT 12, *Tank Farm ALARACT Demonstration for Packaging and Transportation of Equipment and Vehicles*

ALARACT 15, *Tank Farm ALARACT Demonstration for Size Reduction of Waste Equipment for Disposal*

ALARACT 16, *Tank Farm ALARACT Demonstration for Work on Potentially Contaminated Ventilation System Components*.

RPP-11731, 2003, *Thermal Hydraulic Evaluation for the 241-AW Tank Farm Primary Ventilation System*, Rev. 0, CH2M HILL Hanford Group Inc., Richland, Washington.

RPP-QAPP-004, 2001, *CHG Quality Assurance Program Plan For Tank Farm Contractor Radioactive Air Emissions*, Rev.0, CH2M HILL Hanford Group, Inc., Richland, Washington.

TFC-PLAN-02, 2002, *Quality Assurance Program Description*, Rev. A, CH2M HILL Hanford Group, Inc., Richland, Washington.

Tank Waste Information Network System (TWINS) database, Queried September 9, 2003, [Sample Analysis], http://twins.pnl.gov/twins.htm.

WAC 197-11-845, "SEPA Rules," *Washington Administration Code*, as amended.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code*, as amended.

Attachment 2
04-ED-028

Hanford Site Air Operating Permit 00-05-006,
"Notification of Off-Permit Change"

HANFORD SITE AIR OPERATING PERMIT

Notification of Off-Permit Change

Permit Number: 00-05-006

This notification is provided to the State of Washington, Department of Ecology; Washington State Department of Health; and the U.S. Environmental Protection Agency as notice of an off-permit change described as follows.

This change is allowed pursuant to WAC 173-401-724(1) as: 1. Change is not specifically addressed or prohibited by the permit terms and conditions 2. Change does not weaken the enforceability of the existing permit conditions 3. Change is not a Title I modification or a change subject to the acid rain requirements under Title IV of the FCAA 4. Change meets all applicable requirements and does not violate an existing permit term or condition 5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Provide the following information pursuant to Washington Administrative Code 173-401-724(3):

Description of the change:	
Submittal of *Radioactive Air Emissions Notice of Construction, Project W-314 – Operation of New Ventilation Systems in AN and AW Tank Farms*, due to an increase in capacity (ventilation flow rate). This notice of construction allows replacement of the existing ventilation system with a new system with a higher flow rate. The new ventilation system also has abatement controls and monitoring devices that meet current standards. The current emission units (200E P-296AN-001 and 200EP-296AW-001) operate at approximately 1,000 ft^3/min. The new ventilation systems will be capable of operating up to 4,000 ft^3/min.	
Date of Change: To be provided in the agency approval order.	
The date the approval order is issued by Washington State Department of Health.	
Describe the emissions resulting from the change:	
Current emissions from the existing AN and AW ventilation system were reported as a dose to the public of 9.1E-09 mrem/year (6.3E-09 for AN and 2.8E-09 for AW). These values are from DOE/RL-2003-19, *Radioactive Air Emissions Report for the Hanford Site, Calendar Year 2002*. The abated dose to the public from the operation of these new ventilation systems is estimated to be 2.6 mrem/year (1.4 for AN and 1.2 for AW).	
Describe the new applicable requirements that will apply as a result of the change: To be provided in the agency approval order.	
Conditions and limitations will be those identified in the approved order when issued by Washington State Department of Health.	
For Hanford Use Only:	
AOP Change Control Number:	Date Submitted: